DOCUMENT RESUME

ED 073 331 AC 014 084

AUTHOR	Kent, William P.
TITLE	Test Data on Adult Basic Education Students. Second Interim Report.
INSTITUTION	System Development Corp., Falls Church, Va.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Office of Planning, Budgeting, and Evaluation.
PUB DATE	Dec 72
CONTRACT	OEC-0-71-3706
NOTE	27p.; Supplement to "Data on Selected Students in Adult Basic Education Programs, 1971-72; a Preliminary Report from an Ongoing Longitudinal Study," Sept. 1972
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Achievement Gains; *Achievement Tests; *Adult Basic Education; Adult Students; Age Differences; Data Analysis; *Longitudinal Studies; Low Achievement Factors; Racial Factors; Sex Differences; Tables (Data); Technical Reports
IDENTIFIERS	Tests of Adult Basic Education

ABSTRACT

As part of an ongoing longitudinal study of adult basic education (ABE), reading and mathematics tests selected from the Tests of Adult Basic Education were initially administered to a national sample of selected types of ABE students in early 1972; comparable forms were later re-administered to as many of the same students as possible. Attendance data were collected on which to base estimates of hours of instruction between tests. The calendar interval between tests was usually 4 or 5 months. The percentage of students gaining a full grade or more was 26% for reading and 20% for mathematics. Initial test scores are somewhat related to amount of previous schooling and to race, sex, and age (whites, females, and younger students tended to score higher than minorities, males, and older students). Gains between tests were highest, on the whole, for students with the lowest initial scores. Gains showed no clear relationship with attendance, race, age, or previous schooling. Females gained slightly more than males, even though they started at somewhat higher levels. A comparison made with test results obtained in a study of basic education students enrolled in Manpower Development and Training Act (MDTA) programs showed that the MDTA students had higher initial scores but made similar gains for similar numbers of hours of attendance. (Author/KM)

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SECOND INTERIM REPORT

TEST DATA ON ADULT BASIC EDUCATION STUDENTS

DECEMBER 1972

PREPARED FOR

OFFICE OF PLANNING, BUDGETING AND EVALUATION
U.S. OFFICE OF EDUCATION

AE014084

Second Interim Report

Contract No.: OEC-0-71-3706

Test Data on
Adult Basic Education Students

William P. Kent, Principal Investigator

System Development Corporation
5827 Columbia Pike
Falls Church, Virginia 22041

December 1972

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view and opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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PREFACE

This second interim report is a supplement to an earlier report from the same study: Data on Selected Students in Adult Basic Education Programs, 1971-72; a Preliminary Report from an Ongoing Longitudinal Study, September, 1972. The earlier report briefly describes the scope, purposes, and methods of the entire study; it should be referred to for various details which are not repeated here, as well as for the information it provides on ABE students.

SECTION 1 - SUMMARY AND HIGHLIGHTS

As a part of an ongoing longitudinal study of adult basic education funded under the Federal Adult Education Act, students were given reading and mathematics tests during the first six months of 1972. This report contains information on the results of those tests.

The tests used were selected from the Tests of Adult Basic Education (TABE). They were initially administered to a national sample of selected types of ABE students in early 1972; comparable forms were later re-administered to as many of the same students as possible. Attendance data were collected on which to base estimates of hours of instruction between tests. The calendar interval between tests was usually four or five months.

Average student achievement on the tests was:

	Reading	Mathematics
Grade Level on Initial Tests	5.4	6.4
Grade Level Gain Between Tests	0.5	0.3

The percentage of students gaining a full grade or more was 26% for reading and 20% for mathematics. The median number of hours of instruction between tests was 66.

Initial test scores are somewhat related to amount of previous schooling, although most students score at grade levels below those which they have previously completed in school. Initial scores are also somewhat related to race, sex, and age (whites, females, and younger students tended to score higher than blacks or other minorities, males, and older students).

Gains between tests were highest, on the whole, for students with the lowest initial scores. For those with initial scores below the fifth grade, the average gain was 0.8 grades in both reading and mathematics. Gains between tests showed no clear relationship with attendance, race, age, or previous schooling. Females gained slightly more than males, even though they started at somewhat higher levels.

In a final section of this report, a comparison is made with test results obtained in a study of basic education students enrolled in MDTA programs. The MDTA students had higher initial scores but made similar gains for similar numbers of hours of attendance.

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SECTION 2 - DATA COLLECTION AND ANALYSIS

The data on which this report is based were collected from a national sample of ABE program participants. However, enrollees over 44 years old were excluded from the scope of the study. Also excluded were institutionalized or migrant enrollees, and enrollees in ESL or GED classes (English as a second language or high school equivalency classes). Sampling methods are described in this study's first interim report, Data on Selected Students in Adult Basic Education Programs . . . , September, 1972.

I. CHOICE OF TESTS

No existing test was discovered which was ideally suited to this study's needs. (Criteria of importance included content, format, existence of norms, acceptability to ABE students and staff, ease of administration, and cost.) After consideration of advantages and disadvantages of the various candidate tests, a battery was selected consisting of Tests 2 (Reading Comprehension) and 4(Arithmetic Fundamentals) from Level M of Tests of Adult Basic Education (TABE), published by CTB/McGraw-Hill.

Tests considered are listed and commented on below. The comments summarize the key considerations leading to selection of the TABE battery and rejection of the other possibilities. Tests which are still under development were not considered and are not listed below.

WRAT (Wide Range Achievement Test). This instrument is too brief to be used as a measure of improvement; only one form exists, so that pre-tests and post-tests would be exactly the same; the reading portion can be administered only to individual students, one at a time.

FAS (Fundamental Achievement Series). The adult orientation of this test appears superior to that of all others examined. However, it has only one form, it requires a tape or cassette player for administration, and no usable norms have been established.

ABLE (Adult Basic Learning Examination). The adult orientation of this test is superior to that of the TABE, and the test is at least equal to the TABE in most other important aspects except one. Its critical defect is that it is essentially unusable to measure improvements above the 5th grade level. Since about 40% of ABE students are at the 6th-8th grade level, this failing makes the ABLE unacceptable. (See reviews in Journal of Educational Measurement 5:271-274, 1968; and Journal of Counseling Psychology 16:278-280, 1969.)

ABE Student Survey, published by Follett Educational Corporation. Compares favorably with the TABE in all aspects except costs, which are approximately twice that of the TABE.

Durrell Listening-Reading. No arithmetic; not adult oriented.

Gray Oral Reading. No arithmetic; not adult oriented; not group administered.

SAT, MAT, CAT, ITBS (Stanford, Metropolitan, and California Achievement Tests; Iowa Tests of Basic Skills). These are widely-used tests for children, and they are sometimes used for adults. Their use for adults, however, is at least inappropriate and perhaps damaging. In addition, SAT, MAT, and CAT require from 4 to 5 different levels to cover grades 1-8 -- a logistic near-impossibility for our project. ITBS requires reading at least at the third grade level, and combines all levels into one complex and expensive booklet designed for reuse.

TABE. Advantages are an attempt (though not entirely successful) at adult orientation; a single level ("M" - Medium), which covers almost all grades of concern; availability in two equivalent forms, for pretest and post-test; grade-level norms; normed parts which can be used to keep test time under two hours; direct comparability to the MDTA-ABE evaluation study, which used the TABE; and reasonable price. Disadvantages include its

being somewhat childish and school-oriented; in addition, its validity, reliability, and norms are "inherited" rather than independently established. Technically, this "inheritance" is a very serious defect. (See the review by S. Alan Cohen in Journal of Counseling Psychology 16:281, 1969.) Nevertheless, for this study it is superior to all other available tests.

The TABE has three levels ("E", Easy; "M", Medium; and "D", Difficult). Level E is suitable for grades 1 through 4; M for grades 2 through 9; and D for grades 3 through 12. Since Level M covers all grades of interest to this study except 1.0-1.9, it is nearly satisfactory all by itself. Furthermore, administration of two levels to the same class is impractical under the circumstances imposed by this study; and the effort to isolate those classes where all students were at the 4th grade or below in both reading and arithmetic, so that Level E could be used, would be more trouble than it was worth. Finally, TABE Level E is the least successful of all levels in its attempted adult orientation. Therefore, only Level M was used.

Within Level M, Test 2 (Reading Comprehension, 42 min.) and Test 4 (Arithmetic Fundamentals, 50 min.) were used, as comprising the most reasonable minimum battery for basic skills.

II. TEST AND ATTENDANCE DATA PROCEDURES

The publisher's standardized procedures for the TABE were followed. IBM answer sheets were used and were machine scored. Since the publisher's Examiner's Manual covers more tests and a greater variety of circumstances than needed for this study, a modified manual was prepared, eliminating all unnecessary sections.

A brief explanation of the purpose of the tests was prepared, along with specific directions on timing, handling, and other procedural details. A draft version of these directions was successfully field-tested at

several ABE classes in Maryland (not included in the study's sample) before the final version was prepared.

Tests and instructions were distributed to local ABE program administrators, with requests to have classroom teachers or other qualified persons administer the tests according to the instructions provided. Tests were packaged for individual classes. Each package included a list of students to be tested, test booklets, answer sheets, and instructions. Extra booklets and answer sheets were provided in case students not in the study's designated sample might be present, and the teacher did not want to exclude them from the testing experience. However, all answer sheets for students not in the sample were discarded. Only results for pre-designated students were used.

Tests were distributed for administration in January and May. Level M Form 1 was used in January, Level M Form 2 in May.

Attendance data were collected by classroom instructors during the year and entered on special forms. These forms showed numbers of class sessions actually attended, student by student and month by month. From this and other information available in project files, the number of hours of instruction between tests for each student was calculated.

III. DATA RATES AND CONFIDENCE INTERVALS

As explained in this study's previous interim report (September, 1972), a sample of 91 ABE programs, 206 classes, and 2,318 students was established, located in 15 States. The sample contains two halves; estimates based on the two halves constitute 50% confidence intervals for the total population studied.

The sample of 2,318 designated students was based on class enrollments in November, 1971. Since tests were given in January and May of 1972,

and since turnover rates among ABE students are rather high, it was expected that many students in the sample would not be present during testing periods.

Numbers of students on which test and attendance data were obtained are as follows:

Initial Tests	January	800
	February	215
	Late tests	93
	Total	1,108
Second Tests	April	3
	May	511
	Late tests	64
	Total	578
Attendance Data		1,629
Both Initial and Second Tests (for computation of gains)		
	Reading	441
	Mathematics	441
Attendance Data and Complete Test Data	Reading	399
	Mathematics	393

Illustrative confidence intervals were calculated for test gains by employment status and last grade of school completed, as follows:

Mathematics Gain, by Employment Status

Mean Gain, if Working Now	0.29
50% Confidence Interval	0.28-0.30
Mean Gain, if Not Working Now	0.39
50% Confidence Interval	0.28-0.53

Reading Gain, by Last Grade of School Completed

Mean Gain for less than 7 grades	0.72
50% Confidence Interval	0.71-0.73
Mean Gain for grades 7-8	0.28
50% Confidence Interval	0.15-0.44
Mean Gain for grades 9-10	0.39
50% Confidence Interval	0.36-0.42
Mean Gain for grades 11 and above	0.61
50% Confidence Interval	0.28-0.93

SECTION 3 - TEST RESULTS

Data from basic skills tests taken by ABE students during the first half of 1972 are presented on the following pages. Selected crosstabulations and correlations with other information on the same students are also presented. Principal findings are summarized in bar charts; additional details are provided in adjoining tables. Comments in the text point out highlights of the charts and tables.

I. SUMMARY OF TEST RESULTS

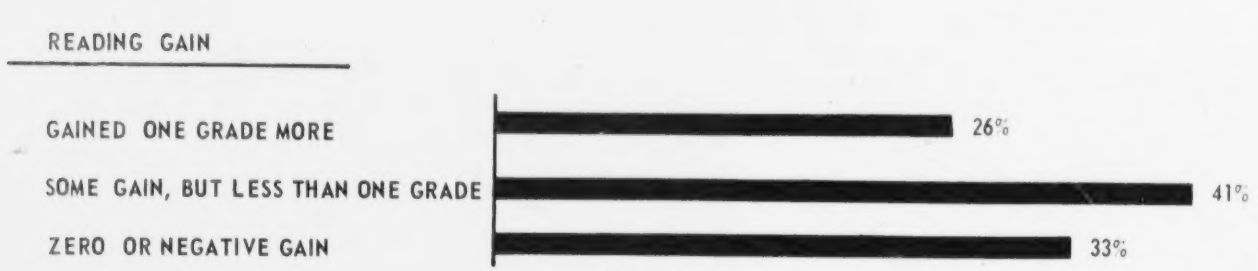
A. INITIAL TESTS

Almost all of the initial tests were given in January and February of 1972. At that time, students had been enrolled in ABE at least since November -- some, much longer. Results of these tests showed, on the average, a reading achievement at about the middle of the fifth grade (5.4) and a mathematics achievement at about the middle of the sixth grade (6.4).

Initial Grade Levels	Reading	Mathematics
Below 3rd grade	12.1%	1.5%
Below 4th grade	27.0%	10.9%
Below 5th grade	42.1%	20.6%
Below 6th grade	59.9%	38.9%
Below 7th grade	78.3%	61.8%
Below 8th grade	92.6%	81.2%
Eighth grade or above	7.4%	18.8%
Median	Grade 5.4	Grade 6.5
Mean	Grade 5.4	Grade 6.4
Standard Deviation	1.8 grades	1.7 grades
Range	Grades 2.0-9.5	Grades 2.2-9.7
10-90 Range	Grades 2.7-7.6	Grades 3.8-8.6
25-75 Range	Grades 3.8-6.8	Grades 5.1-7.5

B. GAINS BETWEEN TESTS

Students were retested after a period of approximately four months. The average gain in reading was half a grade; in mathematics, three-tenths of a grade.



Gains Between Tests	Reading	Mathematics
Gained two grades or more	6.8%	3.6%
Gained one grade or more	25.6%	19.5%
Gained one-half grade or more	47.8%	40.8%
Some gain, but less than one-half grade	18.9%	24.5%
Zero or negative gain	33.3%	34.7%
Median gain	0.4 grades	0.3 grades
Mean gain	0.5 grades	0.3 grades
Standard Deviation	1.1 grades	1.0 grades
Range	-4.8 to 6.6	-5.3 to 6.9
10-90 Range	-0.6 to 1.6	-0.6 to 1.2
25-75 Range	-0.2 to 0.9	-0.1 to 0.8

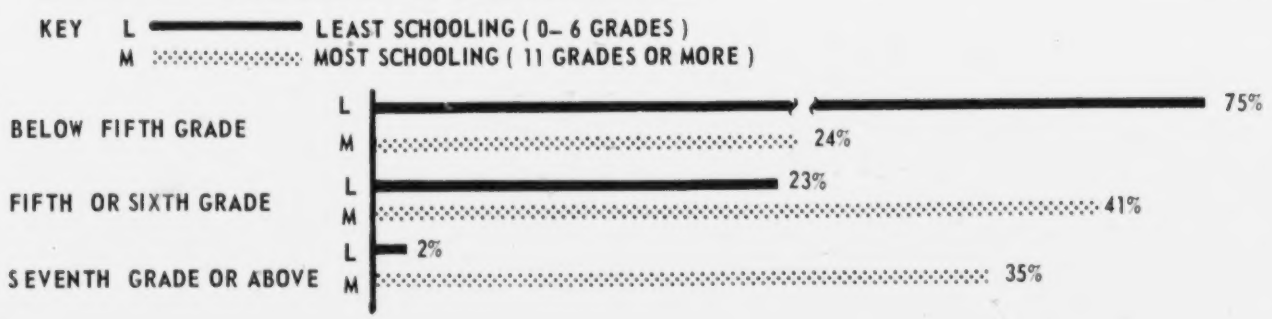
II. RELATIONSHIPS BETWEEN TEST RESULTS AND OTHER DATA

A. INITIAL TEST RESULTS AND PREVIOUS SCHOOLING

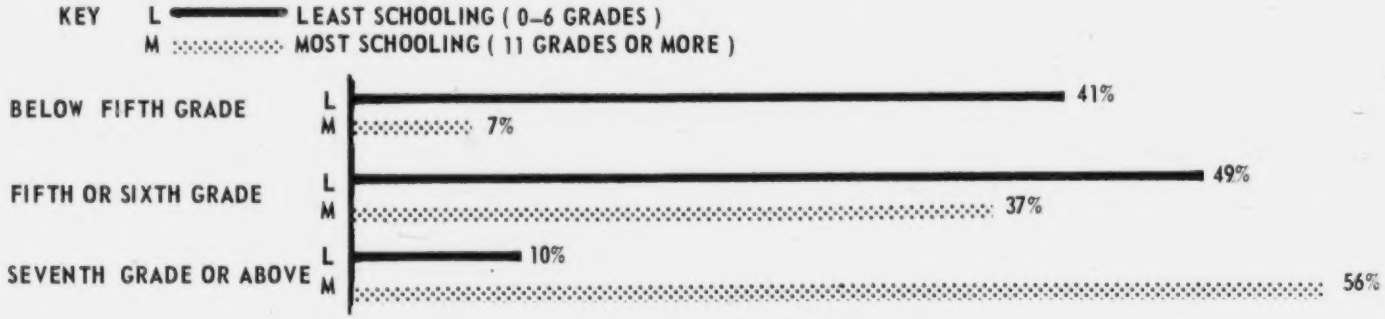
Grade levels achieved on tests are somewhat related to amount of previous schooling. For example, 98% of students who had completed less than seven grades of school also had reading test scores below the seventh grade level. Proportionately fewer of the students who had completed more years of school were as low in reading scores. However, 65% of the students with three or more years of high school had reading scores below the seventh grade level; 44% of this same group had mathematics scores below the seventh grade.

The charts below show test scores for two out of four "previous schooling" subsamples--those with least schooling (less than seven grades) and those with most schooling (11 grades or more). In these charts (and in all charts of this type throughout this report) percentages for each subsample add to 100, and each entry for a subsample indicates the percentage of the subsample achieving at the indicated grade level. For example, the first line of the chart immediately following means, "75% of the group with less than seven years of schooling scored below the fifth grade level on the initial reading tests."

READING SCORES, BY LENGTH OF PREVIOUS SCHOOLING



MATHEMATICS SCORES, BY LENGTH OF PREVIOUS SCHOOLING



The table below presents figures for all four of the "previous schooling" subsamples.

Grade Levels on Initial Tests

Last Grade of School Completed	Reading			Mathematics		
	2.0-4.9	5.0-6.9	7.0-9.5	2.2-4.9	5.0-6.9	7.0-9.7
0-6	75%	23%	2%	41%	49%	10%
7-8	43%	39%	18%	20%	45%	35%
9-10	27%	44%	29%	13%	37%	50%
11 and over	24%	41%	35%	7%	37%	56%

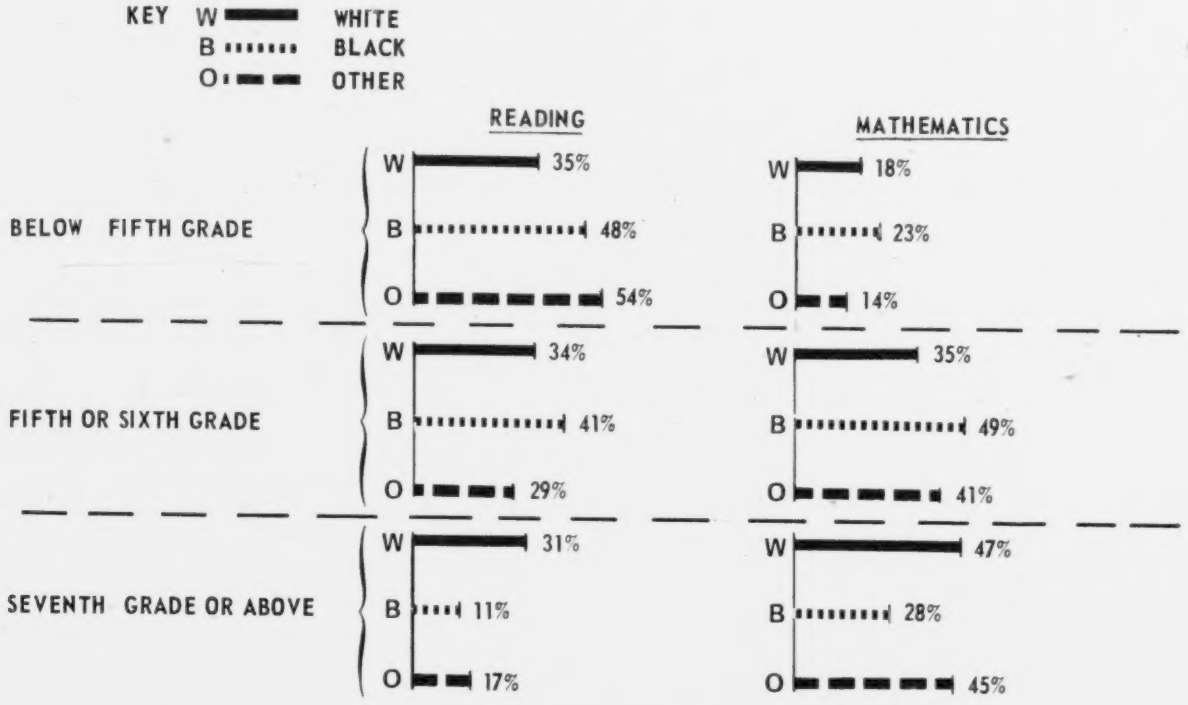
ABE students who already have obtained high school diplomas or certificates scored higher, on the whole, than students who dropped out before completing high school. Of the drop-outs, those who said that when they left school they did not want to continue, scored generally higher than those who wanted to continue.

Previous Attitude Toward School	Grade Levels on Initial Tests					
	Reading			Mathematics		
	2.0-4.9	5.0-6.9	7.0-9.5	2.2-4.9	5.0-6.9	7.0-9.7
Obtained High School Credential	24%	39%	37%	7%	37%	56%
Left School but Wanted to Continue	47%	37%	16%	22%	44%	34%
Left School and Did Not Want to Continue	36%	39%	25%	20%	38%	42%

B. INITIAL TEST RESULTS AND DEMOGRAPHIC CHARACTERISTICS

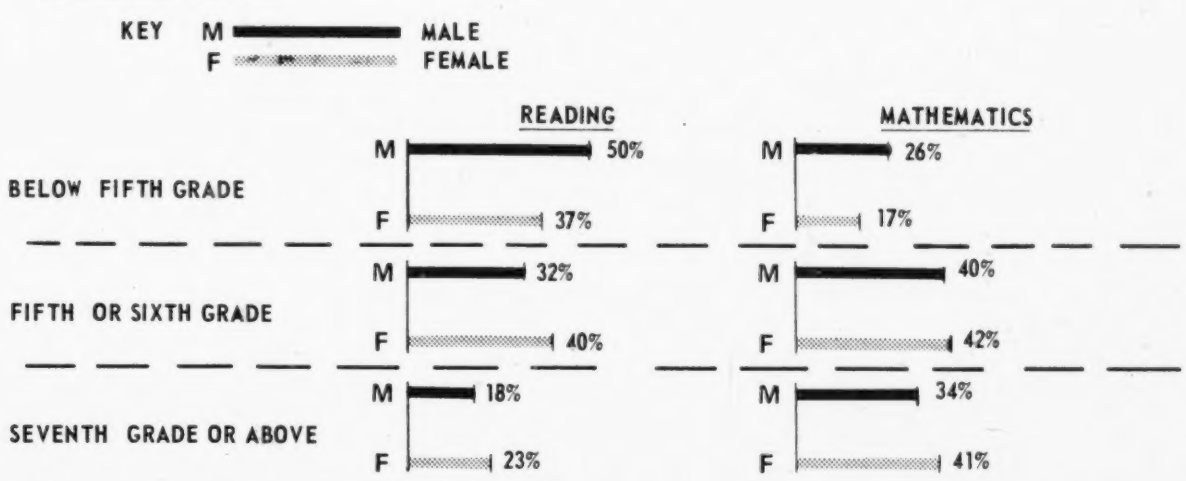
Race. Whites scored proportionately better than blacks or others on the initial tests. The differences were greater on the reading tests than they were on the mathematics tests.

TEST SCORES, BY RACE



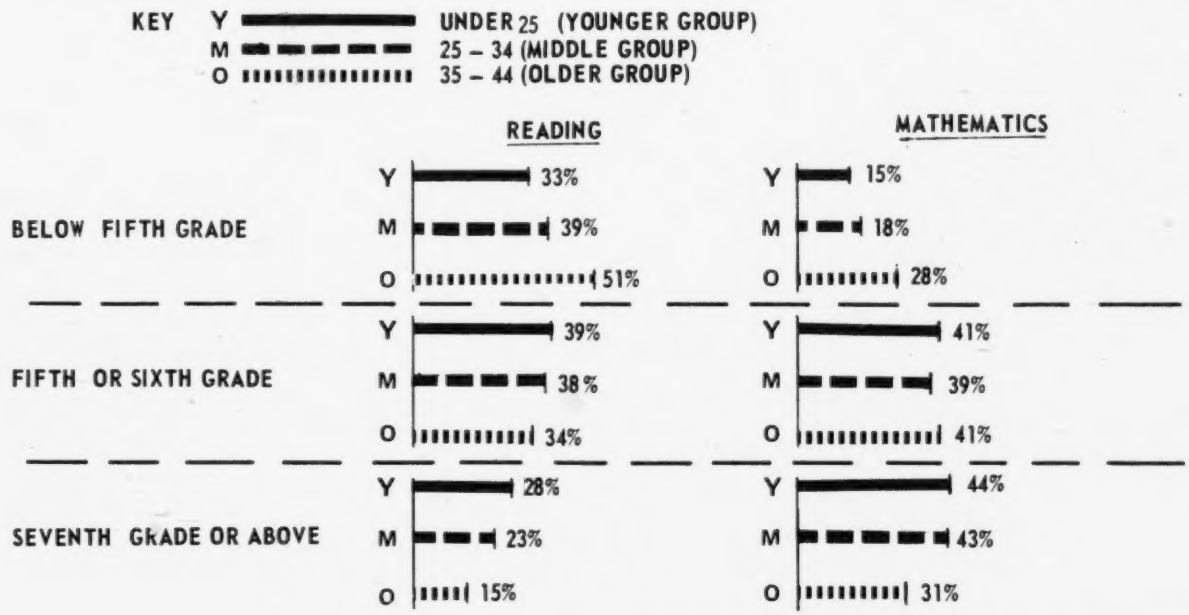
Sex. Females scored proportionately somewhat better than males on the initial tests. Reading differences were slightly greater than mathematics differences.

TEST SCORES, BY SEX



Age. Students under 25 did better, on the whole, than older students (25-44). (Students aged 45 and above were excluded from the scope of this study.)

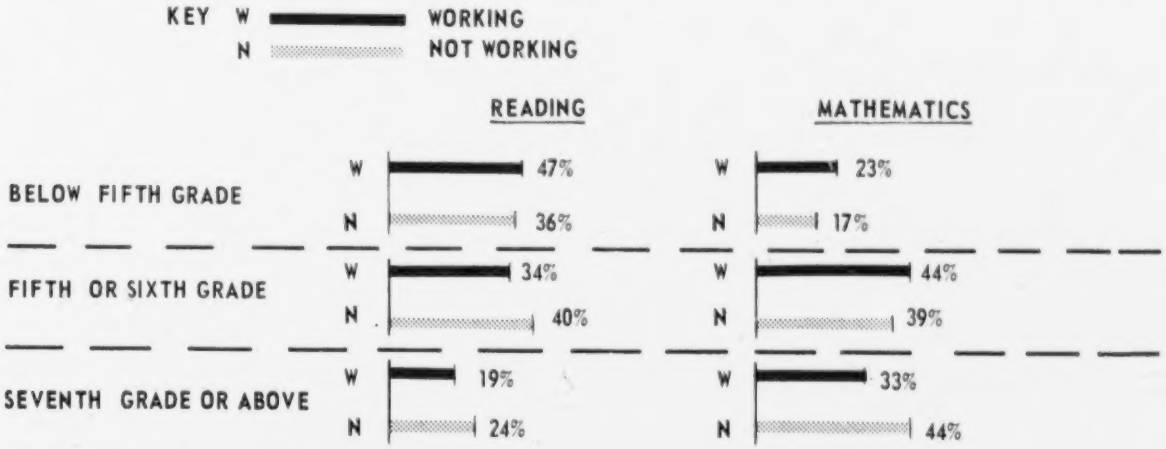
TEST SCORES, BY AGE



C. INITIAL TEST RESULTS AND EMPLOYMENT AND WELFARE STATUS

Current Employment Status. ABE enrollees who were working scored somewhat lower than those who were not working.

INITIAL TEST SCORES, BY CURRENT EMPLOYMENT



Welfare Status. There was no significant relationship between welfare status and initial test scores. Those who received welfare or public assistance scored approximately the same as those who did not.

D. INITIAL TEST RESULTS AND GAINS BETWEEN TESTS

The students with the lowest initial scores tended to gain the most between tests. A small part of this effect is probably related to the fact that the highest levels possible on the tests given were grades 9.5 for reading and 9.7 for mathematics. However, only small numbers of students actually made scores above grade 9.0 on any of the tests. The percentages who did so were:

Test	% Above Grade 9.0
Initial Reading	1.4%
Second Reading	2.0%
Initial Mathematics	5.5%
Second Mathematics	4.6%

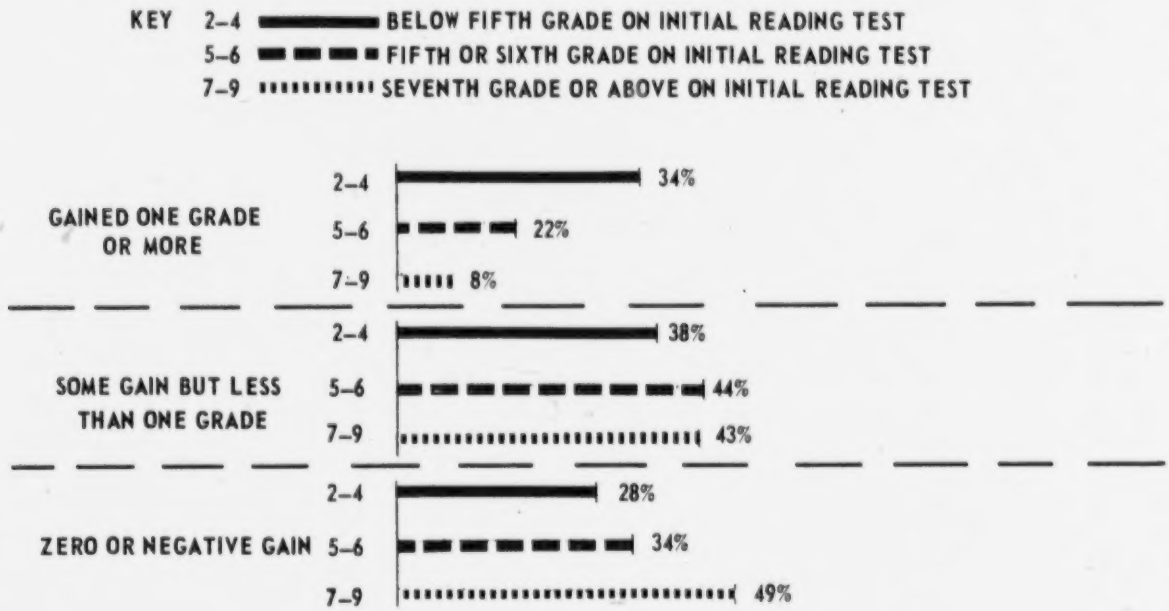
Average gains, by initial test levels, were:

Initial Reading Level	Average Reading Gain
Below Fifth Grade	0.8
Fifth or Sixth Grade	0.3
Seventh Grade or Above	0.0

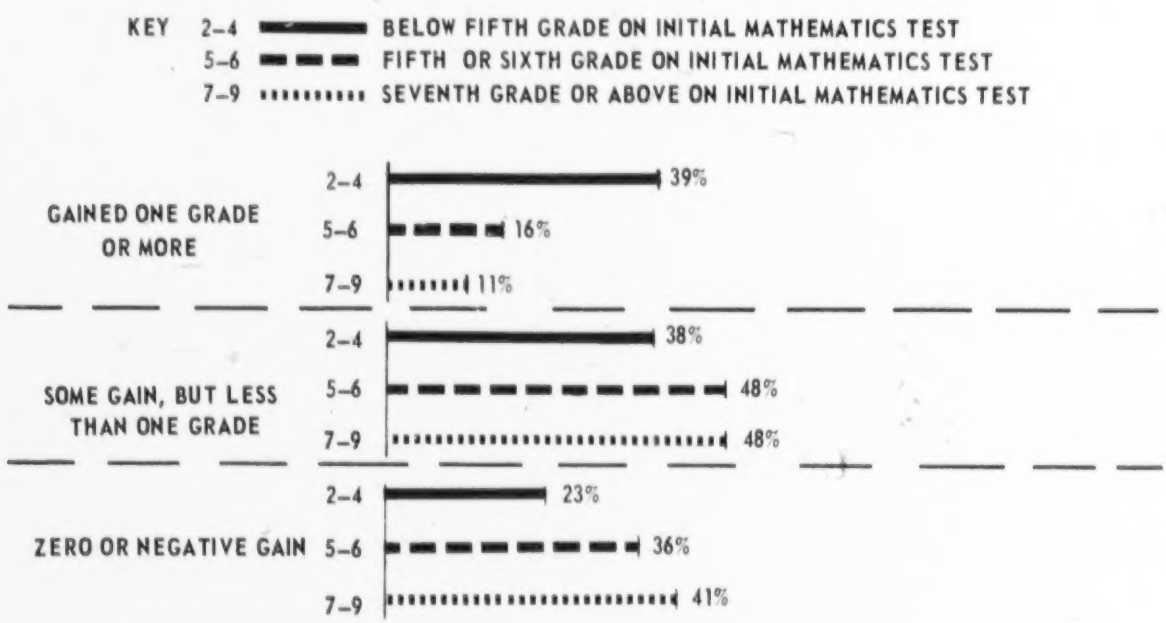
Initial Mathematics Level	Average Mathematics Gain
Below Fifth Grade	0.8
Fifth or Sixth Grade	0.3
Seventh Grade or Above	0.1

The charts below show, by initial grade levels, the percentages that gained various amounts. For example, reading scores show that 34% of those who initially scored below the fifth grade gained one grade or more, whereas only 8% of those who initially scored at the seventh grade or above gained one grade or more.

READING GAINS, BY INITIAL READING LEVEL



MATHEMATICS GAINS, BY INITIAL MATHEMATICS LEVEL



Correlations were computed between reading and mathematics initial scores and between reading and mathematics gains. These figures show a high and significant correlation between initial reading and initial mathematics scores (0.73). There is a much smaller correlation (0.19) between gains in reading and gains in mathematics.

E. ATTENDANCE AND GAINS BETWEEN TESTS

Attendance information was available on a good many of the tested students. The median attendance between tests was approximately 66 class hours, generally spread over a four month period. As tabulated on page 3-3, the median gains associated with the median 66 hours of instruction were four-tenths of a grade for reading and three-tenths of a grade for mathematics.

The average gains for various attendance periods were as follows:

Class Hours Attended Between Tests	Average Grade Level Gain	
	Reading	Mathematics
Less than 46 hours	0.4	0.5
46-60 hours	0.2	0.4
61-88 hours	0.8	0.4
89 or more hours	0.4	0.3

The foregoing figures show that reading gains are irregularly greater after a larger number of hours of instruction. Paradoxically, mathematics gains decline slightly with additional hours of instruction. Crosstabulations shed little light on this matter. A tabulation of mathematics gains by hours between tests reveals no significant pattern. Tabulation of reading gains by hours between tests does show a degree of relationship between the highest gains (those of a full grade or more) and a greater number of hours of instruction, as follows:

Class Hours Attended Between Tests	Percent of Students with this Attendance Gaining a Full Grade or More (Reading)
Less than 45 hours	16%
46-60 hours	16%
61-88 hours	38%
89 or more hours	30%

Further analyses of attendance data will be made for this study's final report.

F. RELATIONSHIPS BETWEEN TEST GAINS AND OTHER DATA

Test Gains and Demographic Characteristics. Females tended to gain more than males, even though females initially scored higher (Section B above). No clear-cut relationships between race or age and test gains are evident. Whites gained less than blacks or others in reading, but more in mathematics. The middle age group studied (25-34) gained slightly less than either the younger group or the older group.

	Average Grade Level Gain	
Race	Reading	Mathematics
White	0.4	0.4
Black	0.5	0.3
Other	1.1	0.2

	Average Grade Level Gain	
Sex	Reading	Mathematics
Male	0.4	0.3
Female	0.6	0.4

	Average Grade Level Gain	
Age	Reading	Mathematics
Under 25	0.5	0.4
25-34	0.4	0.3
35-44	0.5	0.4

Test Gains and Previous Schooling. Relationships between test gains and previous school experience show no consistent pattern. Average grade level gains, by last grade of school completed and by previous attitude toward school, are as follows:

Last Grade of School Completed	Average Grade Level Gain	
	Reading	Mathematics
0-6	0.7	0.3
7-8	0.3	0.3
9-10	0.4	0.4
11 and over	0.6	0.4

Previous Attitude toward School	Average Grade Level Gain	
	Reading	Mathematics
Obtained High School Credential	0.5	0.4
Left School but Wanted to Continue	0.5	0.3
Left School and Did Not Want to Continue	0.4	0.4

Test Gains and Employment and Welfare Status. Test gains did not consistently vary according to employment or welfare status. Differences in gains between workers and non-workers were not statistically significant. Similarly, there were no significant differences in gains evident between those receiving welfare or public assistance and those not receiving welfare or public assistance.

SECTION 4 - COMPARISON WITH SELECTED MDTA BASIC EDUCATION ENROLLEES

During the same school year (1971-72) in which the above tests were given, approximately the same tests were given to students enrolled in a different group of basic education classes: those conducted by the Manpower Development and Training Act (MDTA) Institutional Training Program. The MDTA Basic Education enrollees were tested as a part of a study conducted by North American Rockwell Information Systems Company for the U.S. Office of Education (contract OEC-0-71-4715). Although that study's report has not yet been released in final form, data from the study were made available for comparison purposes.

Before tabulating comparisons between the two studies, several differences in methodology should be noted, since they have considerable bearing on interpretations to be given to the data. One important difference is that the ongoing longitudinal study of the ABE program (referred to in the following paragraphs as "the ABE study") is based on a national sample of students, selected according to a design aimed at reaching estimates applicable to the entire program. By contrast, the study of Basic Education trainees in the MDTA program (referred to as "the MDTA study") was purposely not based on a national sample. Instead it took a case study approach in which sites and students were picked for a variety of reasons including geographic distribution, interest, and scheduling considerations.

Another important difference between the two studies relates to the basic skills tests used. Although both studies used the Tests of Adult Basic Education (TABE) published by CTB/McGraw Hill, the ABE study used only one level of the test (Medium). The MDTA study, on the other hand, used all three levels (Easy, Medium, and Difficult). However, there is some evidence presented in the MDTA study that the Medium and Difficult tests are not properly matched to each other in grade equivalency. MDTA students who took pretests at the Medium level and posttests at the Difficult level appeared to achieve artifically inflated gains.

In addition to differences in methodology, the two studies of course were concerned with programs having different orientations and purposes. The MDTA basic education work is carried out as a part of a job training program; ABE, as such, is usually not directly related to job training.

Recognizing therefore the lack of strict comparability between data from the two studies, a review of findings is still of interest. The tabulations below present basic statistics on student characteristics, along with average test socres. MDTA gains are tabulated only for the students who took the Medium level test both "before" and "after", since only these students took tests at the same level as the students in the ABE study.

	ABE	MDTA
Student Characteristics		
Sex		
Female	62%	45%
Male	38%	55%
Race		
White	48%	37%
Black	44%	47%
Other	8%	16%
Age		
Under 23	28%	39%
23 - 30	30%	33%
31 - 44	42%	20%
Over 44	Not included	7%
Last grade of school completed	10.2	10.8
Average Grade Levels on Initial Tests		
Reading	5.4	7.4
Mathematics	6.4	7.7
Average Gains and Attendance Between Tests		
Reading Gain	0.5 grades	0.4 grades
Attendance	66 hours*	54 hours

*Median

As indicated in the above tabulation, the MDTA population contained a larger proportion of males and of younger students than the ABE population. The MDTA students had completed about half a grade more of schooling, on the whole, than the ABE students. In addition, the MDTA students scored 1.3 to 2.0 grade levels higher on initial tests than the ABE students. However, average gains and hours of instruction between tests were not very different for the ABE and MDTA students who took the same tests.

Reading gains for the students who took the same tests showed the following breakdowns for the two studies:

		Average Grade Level Gain	
		ABE	MDTA
Race			
	White	0.4	0.5
	Black	0.5	0.4
Sex			
	Male	0.4	0.3
	Female	0.6	0.5
Age*			
	Younger	0.5	0.4
	Middle	0.4	0.3
	Older	0.5	0.6
Number of Hours of Instruction Between Tests**			
	Least	0.4	0.3
	Low Middle	0.2	0.4
	High Middle	0.8	0.3
	Most	0.4	0.6

Because of the differences in method noted above, these comparisons between figures from the two studies should be considered as suggestive rather than definitive. Similarities in pattern do occur for sex (females gain slightly more than males) and for age (younger and older groups gain slightly more than the middle group). Both studies also show a noticeable but unsteady relationship between reading gains and hours of instruction.

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* Different intervals for age were used in the two studies, as follows: ABE -- under 25, 25-34, and 35-44; MDTA -- under 23, 23-30, and 31-44.

** The different intervals for hours of instruction used for the two studies were: ABE -- under 46, 46-60, 61-88, 89 or more; MDTA -- under 51, 51-75, 76-99, 100 or more.

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